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PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Joan Fallon

Serial No: 09/990,909

Filed: November 16, 2001

Examiner: Zachariah Lucas

Group Art Unit: 1648

Docket: 8016-5

For: METHODS FOR DIAGNOSING PERVASIVE DEVELOPMENT DISORDERS, DYSAUTONOMIA, AND OTHER NEUROLOGICAL CONDITIONS

Assistant Commissioner for Patents
Washington, D.C. 20231

DECLARATION UNDER 37 C.F.R. §1.132

I, Joan Fallon, in my capacity as an applicant and sole inventor of the subject matter of the above-identified application, hereby declare as follows.

I have been an assistant professor of Natural Sciences and Mathematics at Yeshiva University, New York, New York in the biology department. I have taught developmental biology and physiology for over 10 years.

I have working in the field of Pediatrics since 1983. I am self-employed and I currently practice in Yonkers, New York, specializing in children with developmental delays.

I further have seen in clinical practice, a multitude of clinical conditions, the least of which are genetic in nature. One aspect of my research has been in the field of identifying biomarkers for specific conditions.

This Declaration is respectfully submitted in response to the Office Action dated July 30, 2002 to demonstrate that a "reasonable correlation" exists between (i) the presence of a plurality of different antigens in a stool sample of an individual and (ii) the existence of a

disorder such as Dysautonomia, Parkinson's disease, and PDD (such as Autism, ADD and ADHD), or the potential for the individual to develop such disorders.

Through research, as presented in my specification, I have discovered that *a plurality of different antigens associated different pathogens is commonly found in stool samples of populations of individuals having various disorders such as PDD, Dysautonomia and Parkinson's disease*. Indeed, the data presented in Figs. 1-4 of my application illustrates that individuals having Familial Dysautonomia, Parkinson's disease, ADD, ADHD, and Autism, have the presence of multiple different pathogens and/or associated antigens in their digestive tract. To my knowledge, there have been no reports heretofore in the literature with respect to the presence of multiple pathogens in an individual, for any condition, much less the presence of multiple pathogens in the GI tract of those individuals having PDD, Dysautonomia, or Parkinson's disease. Furthermore, to my knowledge, the presence of multiple pathogens as a result of stool antigenic testing in those with ADD, ADHD, Autism, Parkinson's or Dysautonomia, has not been reported in the literature.

Moreover, it is to be noted that in other related research, I have discovered the existence of other common links between PDDs, Dysautonomia and Parkinson's disease, with respect to GI function. For instance, I have discovered that *sub-normal levels of fecal chymotrypsin* is commonly found in populations of individuals having disorders such as PDD, Dysautonomia and Parkinson's disease. These findings are presented in U.S. Patent Application Serial Nos. 09/466,559, 09/707,395, and 09/929,592, which are all incorporated by reference in the specification of this application.

It is respectfully submitted that these unique findings provide impetus for the potential use of pathogen screening in the GI tract of an individual as diagnostic tool for disorders such

as PDD, Dysautonomia and Parkinson's disease, and in particular, the use of stool antigenic testing as a diagnostic tool for such disorders.

There are various statistical tests that may be applied to the data presented in my specification to demonstrate the existence of a "reasonable correlation" between (i) the presence of a plurality of different antigens in a stool sample of an individual and (ii) the existence of a disorder such as Dysautonomia, Parkinson's disease, and PDD (such as Autism, ADD and ADHD), or the potential for the individual to develop such disorders.

As is well known in the art, in hypothesis testing, the "null hypothesis" (statistical hypothesis) is a mechanism for determining if an observed difference between groups is only the result of chance. With respect to my invention, the null hypothesis, *Ho*, states that there is no relationship between the presence of multiple pathogens in an individual and the individual having, or developing, a disorder such as PDD, Dysautonomia, or Parkinson's disease, and that such relationship is due to chance. As set forth below, I have performed several well-known statistical tests to statistically test and reject the null hypotheses. These tests were performed using the known SPSS (Statistical Package for the Social Sciences) application.

One such test that may be used as measure of correlation is the well-known *Pearson Product-Moment Correlation Coefficient* (the "Pearson Test"). The Pearson r is the most commonly reported measure of correlation. The Pearson r is always between -1 and +1, with the sign indicating the direction of the relationship. The absolute value of r indicates the strength of the relationship, with an absolute value of 1 representing a perfect linear relationship and a value of 0 representing no relationship. If the null hypothesis is true, then $r = 0$.

I. PATHOGENS and ADD/ADHD

I performed *Pearson Product Moment* correlations and *Kendall tau b* correlations using the data presented in Fig. 3 of my specification for the 13 ADD/ADHD subjects and 13 non-ADD/ADHD subjects (N=27 subjects). This test was performed to determine if the variables (i.e., the different pathogens) are associated with one another. The results were as follows:

Correlations

		ADDHD	HPHY	CRYPSTOR	E.HYSTOL	GIARDIA	ROTABIRU	CAMPHYLO	CDFICIEL
ADDHD	Pearson Correlation	1	.511**	.642**	.577**	.555**	.614**	.511**	.555**
	Sig. (1-tailed)	.	.003	.000	.001	.001	.000	.003	.001
	N	27	27	27	27	27	27	27	27
HPHY	Pearson Correlation	.511**	1	.174	.229	.238	.356*	.112	.434*
	Sig. (1-tailed)	.003	.	.192	.125	.115	.034	.289	.012
	N	27	27	27	27	27	27	27	27
CRYPSTOR	Pearson Correlation	.642**	.174	1	.434*	.512**	.071	.510**	.328*
	Sig. (1-tailed)	.000	.192	.	.012	.003	.362	.003	.047
	N	27	27	27	27	27	27	27	27
E.HYSTOL	Pearson Correlation	.577**	.229	.434*	1	.567**	.299	.401*	.189
	Sig. (1-tailed)	.001	.125	.012	.	.001	.065	.019	.173
	N	27	27	27	27	27	27	27	27
GIARDIA	Pearson Correlation	.555**	.238	.512**	.567**	1	.497**	.434*	.357*
	Sig. (1-tailed)	.001	.115	.003	.001	.	.004	.012	.034
	N	27	27	27	27	27	27	27	27
ROTABIRU	Pearson Correlation	.614**	.356*	.071	.299	.497**	1	.356*	.497**
	Sig. (1-tailed)	.000	.034	.362	.065	.004	.	.034	.004
	N	27	27	27	27	27	27	27	27
CAMPHYLO	Pearson Correlation	.511**	.112	.510**	.401*	.434*	.356*	1	.043
	Sig. (1-tailed)	.003	.289	.003	.019	.012	.034	.	.415
	N	27	27	27	27	27	27	27	27
CDFICIEL	Pearson Correlation	.555**	.434*	.328*	.189	.357*	.497**	.043	1
	Sig. (1-tailed)	.001	.012	.047	.173	.034	.004	.415	.
	N	27	27	27	27	27	27	27	27

**. Correlation is significant at the 0.01 level (1-tailed).

*. Correlation is significant at the 0.05 level (1-tailed).

Correlations

			ADDHD	HPHY	CRYPSTOR	E.HYSTOL	GIARDIA	ROTABIRU	CAMPHYLO	CDFICIEL
Kendall's tau_b	ADDHD	Correlation Coefficient	1.000	.511**	.642**	.577**	.555**	.614**	.511**	.555**
		Sig. (1-tailed)	.	.005	.001	.002	.002	.001	.005	.002
		N	27	27	27	27	27	27	27	27
	HPHY	Correlation Coefficient	.511**	1.000	.174	.229	.238	.356*	.112	.434*
		Sig. (1-tailed)	.005	.	.187	.121	.112	.035	.284	.014
		N	27	27	27	27	27	27	27	27
	CRYPSTOR	Correlation Coefficient	.642**	.174	1.000	.434*	.512**	.071	.510**	.328*
		Sig. (1-tailed)	.001	.187	.	.013	.004	.358	.005	.047
		N	27	27	27	27	27	27	27	27
	E.HYSTOL	Correlation Coefficient	.577**	.229	.434*	1.000	.567**	.299	.401*	.189
		Sig. (1-tailed)	.002	.121	.013	.	.002	.064	.020	.168
		N	27	27	27	27	27	27	27	27
	GIARDIA	Correlation Coefficient	.555**	.238	.512**	.567**	1.000	.497**	.434*	.357*
		Sig. (1-tailed)	.002	.112	.004	.002	.	.006	.014	.034
		N	27	27	27	27	27	27	27	27
	ROTABIRU	Correlation Coefficient	.614**	.356*	.071	.299	.497**	1.000	.356*	.497**
		Sig. (1-tailed)	.001	.035	.358	.064	.006	.	.035	.006
		N	27	27	27	27	27	27	27	27
	CAMPHYLO	Correlation Coefficient	.511**	.112	.510**	.401*	.434*	.356*	1.000	.043
		Sig. (1-tailed)	.005	.284	.005	.020	.014	.035	.	.413
		N	27	27	27	27	27	27	27	27
	CDFICIEL	Correlation Coefficient	.555**	.434*	.328*	.189	.357*	.497**	.043	1.000
		Sig. (1-tailed)	.002	.014	.047	.168	.034	.006	.413	.
		N	27	27	27	27	27	27	27	27

**. Correlation is significant at the .01 level (1-tailed).

*. Correlation is significant at the .05 level (1-tailed).

For both the *Pearson* and *Kendall's tau b* analyses, the resulting correlations were found to be significant for all pathogens with relationship to ADD and ADHD. While the pathogens may not have had correlations with each other, in the presence of ADD and ADHD they were each statistically correlated. This is significant in that the presence of such pathogens together is therefore not random, but a function of the disease in whom they are present.

To further demonstrate statistical significance of the data presented in Fig. 3 of my specification, a *Phi* coefficient was performed, which expresses the degree of association and relationship in categorical data. In addition, a C*hi Square* statistic was performed to determine if the distribution of frequencies differs from theoretical frequencies. The results were as follows:

(i) ADD/ADHD * H PYLORI

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	7.052[b]	1	.008		
Continuity Correction[a]	4.990	1	.026		
Likelihood Ratio	7.666	1	.006		
Fisher's Exact Test				.013	.011
Linear-by-Linear Association	6.790	1	.009		
N of Valid Cases	27				

a. Computed only for a 2x2 table

b. 2 cells (50.0%) have expected count less than 5. The minimum expected count is 3.85.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.511			.008
	Cramer's V	.511			.008
Ordinal by Ordinal	Kendall's tau-b	.511	.152	3.021	.003
	Spearman Correlation	.511	.152	2.973	.006[c]
Interval by Interval	Pearson's R	.511	.152	2.973	.006[c]
N of Valid Cases		27			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

With a minimum expected count of 3.85, and a Chi square value of 7.052, we see that these variables are not independent of each other and that there is a significant association between ADD/ADHD and H/Pylori. Further, with the variables being nominal in nature, the phi correlation of .511 demonstrates that the degree of association is moderately strong, as normal values of phi range from -1.0 to +1.0.

(ii) ADD/ADHD*CRYPTOSPORIDIUM

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	11.143[b]	1	.001		
Continuity Correction[a]	8.640	1	.003		
Likelihood Ratio	12.341	1	.000		
Fisher's Exact Test				.001	.001
Linear-by-Linear Association	10.730	1	.001		
N of Valid Cases	27				

a. Computed only for a 2x2 table

b. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 4.81.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.642			.001
	Cramer's V	.642			.001
Ordinal by Ordinal	Kendall's tau-b	.642	.140	4.264	.000
	Spearman Correlation	.642	.140	4.191	.000[c]
Interval by Interval	Pearson's R	.642	.140	4.191	.000[c]
N of Valid Cases		27			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

With a minimum expected count of 4.81, and a Chi square value of 11.14, we see that these variables are not independent of each other and that there is a significant association between ADD/ADHD and Cryptosporidium. Further with the variables being nominal in nature, the phi correlation of .642 demonstrates that the degree of association is moderately strong, as normal values of phi range from -1.0 to +1.0.

(iii) ADD/ADHD * E. Hystolitca

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	8.975[b]	1	.003		
Continuity Correction[a]	6.694	1	.010		
Likelihood Ratio	9.844	1	.002		
Fisher's Exact Test				.004	.004
Linear-by-Linear Association	8.643	1	.003		
N of Valid Cases	27				

a. Computed only for a 2x2 table

b. 2 cells (50.0%) have expected count less than 5. The minimum expected count is 4.33.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.577			.003
	Cramer's V	.577			.003
Ordinal by Ordinal	Kendall's tau-b	.577	.146	3.586	.000
	Spearman Correlation	.577	.146	3.528	.002[c]
Interval by Interval	Pearson's R	.577	.146	3.528	.002[c]
N of Valid Cases		27			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

With a minimum expected count of 4.33, and a Chi square value of 8.975, we see that these variables are not independent of each other and that there is a significant association between ADD/ADHD and E. Hystolytica. Further with the variables being nominal in nature, the phi correlation of .577 demonstrates that the degree of association is moderately strong, as normal values of phi range from -1.0 to +1.0.

(iv) ADD/ADHD * GIARDIA

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	8.308[b]	1	.004		
Continuity Correction[a]	5.852	1	.016		
Likelihood Ratio	10.659	1	.001		
Fisher's Exact Test				.006	.006
Linear-by-Linear Association	8.000	1	.005		
N of Valid Cases	27				

a. Computed only for a 2x2 table

b. 2 cells (50.0%) have expected count less than 5. The minimum expected count is 2.89.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.555			.004
	Cramer's V	.555			.004
Ordinal by Ordinal	Kendall's tau-b	.555	.113	3.334	.001
	Spearman Correlation	.555	.113	3.333	.003[c]
Interval by Interval	Pearson's R	.555	.113	3.333	.003[c]
N of Valid Cases		27			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

With a minimum expected count of 2.89, and a Chi square value of 8.31, we see that these variables are not independent of each other and that there is a significant association between ADD/ADHD and Giardia. Further, with the variables being nominal in nature, the phi correlation of .555 demonstrates that the degree of association is moderately strong, as normal values of phi range from -1.0 to +1.0.

(v) ADD/ADHD * ROTOVIRUS

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	10.177[b]	1	.001		
Continuity Correction[a]	7.566	1	.006		
Likelihood Ratio	12.958	1	.000		
Fisher's Exact Test				.002	.002
Linear-by-Linear Association	9.800	1	.002		
N of Valid Cases	27				

a. Computed only for a 2x2 table

b. 2 cells (50.0%) have expected count less than 5. The minimum expected count is 3.37.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.614			.001
	Cramer's V	.614			.001
Ordinal by Ordinal	Kendall's tau-b	.614	.112	3.888	.000
	Spearman Correlation	.614	.112	3.889	.001[c]
Interval by Interval	Pearson's R	.614	.112	3.889	.001[c]
N of Valid Cases		27			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

With a minimum expected count of 3.37, and a Chi square value of 10.18, we see that these variables are not independent of each other and that there is a significant association between ADD/ADHD and Rotovirus. Further with the variables being nominal in nature, the phi correlation of .614 demonstrates that the degree of association is moderately strong, as normal values of phi range from -1.0 to +1.0.

(vi) ADD/ADHD * CAMPHYLOBACTER

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	7.052[b]	1	.008		
Continuity Correction[a]	4.990	1	.026		
Likelihood Ratio	7.666	1	.006		
Fisher's Exact Test				.013	.011
Linear-by-Linear Association	6.790	1	.009		
N of Valid Cases	27				

a. Computed only for a 2x2 table

b. 2 cells (50.0%) have expected count less than 5. The minimum expected count is 3.85.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.511			.008
	Cramer's V	.511			.008
Ordinal by Ordinal	Kendall's tau-b	.511	.152	3.021	.003
	Spearman Correlation	.511	.152	2.973	.006[c]
Interval by Interval	Pearson's R	.511	.152	2.973	.006[c]
N of Valid Cases		27			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

With a minimum expected count of 3.85, and a Chi square value of 7.052, we see that these variables are not independent of each other and that there is a significant association between ADD/ADHD and Camphylobacter. Further with the variables being nominal in nature, the phi correlation of .511 demonstrates that the degree of association is moderately strong, as normal values of phi range from -1.0 to +1.0.

(vii) ADD/ADHD * C DIFICELE

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	8.308[b]	1	.004		
Continuity Correction[a]	5.852	1	.016		
Likelihood Ratio	10.659	1	.001		
Fisher's Exact Test				.006	.006
Linear-by-Linear Association	8.000	1	.005		
N of Valid Cases	27				

a. Computed only for a 2x2 table

b. 2 cells (50.0%) have expected count less than 5. The minimum expected count is 2.89.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.555			.004
	Cramer's V	.555			.004
Ordinal by Ordinal	Kendall's tau-b	.555	.113	3.334	.001
	Spearman Correlation	.555	.113	3.333	.003[c]
Interval by Interval	Pearson's R	.555	.113	3.333	.003[c]
N of Valid Cases		27			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

With a minimum expected count of 2.89, and a Chi square value of 8.308, we see that these variables are not independent of each other and that there is a significant association between ADD/ADHD and C. difficile. Further, with the variables being nominal in nature, the phi correlation of .555 demonstrates that the degree of association is moderately strong, as normal values of phi range from -1.0 to +1.0.

II. PATHOGENS AND PARKINSON'S

Using the data presented in Fig. 2 of my specification for individuals with and without Parkinson's (N=30 subjects total), the following statistical testing was performed in the same manner as that for ADD/ADHD. Pearson product Moment correlations were performed as well as Kendall tau b correlations to determine if the variables are associated with one another. The following tables demonstrate the correlations:

Correlations

		Parkinson	HPYLORI	CRYPTO	EHISTOL	GIARDIA	CAMPHYLO	ROTAVIRU	CDIFF
Parkinson	Pearson Correlation	1	.740**	.707**	.707**	.566**	.603**	.603**	.552**
	Sig. (2-tailed)	.	.000	.000	.000	.001	.000	.000	.002
	N	30	30	30	30	30	30	30	30
HPYLORI	Pearson Correlation	.740**	1	.381*	.381*	.381*	.385*	.537**	.472**
	Sig. (2-tailed)	.000	.	.038	.038	.038	.035	.002	.008
	N	30	30	30	30	30	30	30	30
CRYPTO	Pearson Correlation	.707**	.381*	1	1.000**	.400*	.693**	.373*	.446*
	Sig. (2-tailed)	.000	.038	.	.	.029	.000	.042	.014
	N	30	30	30	30	30	30	30	30
EHISTOL	Pearson Correlation	.707**	.381*	1.000**	1	.400*	.693**	.373*	.446*
	Sig. (2-tailed)	.000	.038	.	.	.029	.000	.042	.014
	N	30	30	30	30	30	30	30	30
GIARDIA	Pearson Correlation	.566**	.381*	.400*	.400*	1	.693**	.213	.279
	Sig. (2-tailed)	.001	.038	.029	.029	.	.000	.258	.136
	N	30	30	30	30	30	30	30	30
CAMPHYLO	Pearson Correlation	.603**	.385*	.693**	.693**	.693**	1	.318	.380*
	Sig. (2-tailed)	.000	.035	.000	.000	.000	.	.087	.038
	N	30	30	30	30	30	30	30	30
ROTAVIRU	Pearson Correlation	.603**	.537**	.373*	.373*	.213	.318	1	.380*
	Sig. (2-tailed)	.000	.002	.042	.042	.258	.087	.	.038
	N	30	30	30	30	30	30	30	30
CDIFF	Pearson Correlation	.552**	.472**	.446*	.446*	.279	.380*	.380*	1
	Sig. (2-tailed)	.002	.008	.014	.014	.136	.038	.038	.
	N	30	30	30	30	30	30	30	30

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Correlations

			Parkinson	HPYLORI	CRYPTO	EHISTOL	GIARDIA	CAMPHYLO	ROTAVIRU	CDIFF
Kendall's tau_b	Parkinson	Correlation Coefficient	1.000	.740**	.707**	.707**	.566**	.603**	.603**	.552**
		Sig. (2-tailed)	.	.000	.000	.000	.002	.001	.001	.003
		N	30	30	30	30	30	30	30	30
	HPYLORI	Correlation Coefficient	.740**	1.000	.381*	.381*	.381*	.385*	.537**	.472*
		Sig. (2-tailed)	.000	.	.040	.040	.040	.038	.004	.011
		N	30	30	30	30	30	30	30	30
	CRYPTO	Correlation Coefficient	.707**	.381*	1.000	1.000**	.400*	.693**	.373*	.446*
		Sig. (2-tailed)	.000	.040	.	.	.031	.000	.045	.016
		N	30	30	30	30	30	30	30	30
	EHISTOL	Correlation Coefficient	.707**	.381*	1.000**	1.000	.400*	.693**	.373*	.446*
		Sig. (2-tailed)	.000	.040	.	.	.031	.000	.045	.016
		N	30	30	30	30	30	30	30	30
	GIARDIA	Correlation Coefficient	.566**	.381*	.400*	.400*	1.000	.693**	.213	.279
		Sig. (2-tailed)	.002	.040	.031	.031	.	.000	.251	.133
		N	30	30	30	30	30	30	30	30
	CAMPHYLO	Correlation Coefficient	.603**	.385*	.693**	.693**	.693**	1.000	.318	.380*
		Sig. (2-tailed)	.001	.038	.000	.000	.000	.	.087	.041
		N	30	30	30	30	30	30	30	30
	ROTAVIRU	Correlation Coefficient	.603**	.537**	.373*	.373*	.213	.318	1.000	.380*
		Sig. (2-tailed)	.001	.004	.045	.045	.251	.087	.	.041
		N	30	30	30	30	30	30	30	30
	CDIFF	Correlation Coefficient	.552**	.472*	.446*	.446*	.279	.380*	.380*	1.000
		Sig. (2-tailed)	.003	.011	.016	.016	.133	.041	.041	.
		N	30	30	30	30	30	30	30	30
Spearman's rho	Parkinson	Correlation Coefficient	1.000	.740**	.707**	.707**	.566**	.603**	.603**	.552**
		Sig. (2-tailed)	.	.000	.000	.000	.001	.000	.000	.002
		N	30	30	30	30	30	30	30	30
	HPYLORI	Correlation Coefficient	.740**	1.000	.381*	.381*	.381*	.385*	.537**	.472**
		Sig. (2-tailed)	.000	.	.038	.038	.038	.035	.002	.008
		N	30	30	30	30	30	30	30	30
	CRYPTO	Correlation Coefficient	.707**	.381*	1.000	1.000**	.400*	.693**	.373*	.446*
		Sig. (2-tailed)	.000	.038	.	.	.029	.000	.042	.014
		N	30	30	30	30	30	30	30	30
	EHISTOL	Correlation Coefficient	.707**	.381*	1.000**	1.000	.400*	.693**	.373*	.446*
		Sig. (2-tailed)	.000	.038	.	.	.029	.000	.042	.014
		N	30	30	30	30	30	30	30	30
	GIARDIA	Correlation Coefficient	.566**	.381*	.400*	.400*	1.000	.693**	.213	.279
		Sig. (2-tailed)	.001	.038	.029	.029	.	.000	.258	.136
		N	30	30	30	30	30	30	30	30
	CAMPHYLO	Correlation Coefficient	.603**	.385*	.693**	.693**	.693**	1.000	.318	.380*
		Sig. (2-tailed)	.000	.035	.000	.000	.000	.	.087	.038
		N	30	30	30	30	30	30	30	30
	ROTAVIRU	Correlation Coefficient	.603**	.537**	.373*	.373*	.213	.318	1.000	.380*
		Sig. (2-tailed)	.000	.002	.042	.042	.258	.087	.	.038
		N	30	30	30	30	30	30	30	30
	CDIFF	Correlation Coefficient	.552**	.472**	.446*	.446*	.279	.380*	.380*	1.000
		Sig. (2-tailed)	.002	.008	.014	.014	.136	.038	.038	.
		N	30	30	30	30	30	30	30	30

**. Correlation is significant at the .01 level (2-tailed).

*. Correlation is significant at the .05 level (2-tailed).

For both the Pearson and the Kendall's tau b tests, the correlations were significant for all pathogens with relationship to Parkinson's disease. While the pathogens may not have demonstrated correlations with each other, in the presence of Parkinson's they were each statistically correlated. This is significant in that their appearance together is therefore not random, but a function of the diseased individual in whom they are present.

To further tests the statistical significance a Phi coefficient was performed which

expresses the degree of association and relationship in categorical data, and a chi square statistic was performed to determine if the distribution of frequencies differs from theoretical frequencies. The results were as follows:

(i) PARKINSONS * H. PYLORI

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	16.425[b]	1	.000		
Continuity Correction[a]	13.575	1	.000		
Likelihood Ratio	18.694	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	15.878	1	.000		
N of Valid Cases	30				

a. Computed only for a 2x2 table

b. 0 cells (.0%) have expected count less than 5. The minimum expected count is 6.50.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.740			.000
	Cramer's V	.740			.000
	Contingency Coefficient	.595			.000
Ordinal by Ordinal	Kendall's tau-b	.740	.119	6.025	.000
	Spearman Correlation	.740	.119	5.821	.000[c]
Interval by Interval	Pearson's R	.740	.119	5.821	.000[c]
N of Valid Cases		30			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

With a minimum expected count of 6.50, and a Chi square value of 16.425, we see that these variables are not independent of each other and that there is a significant association between Parkinson's and H/Pylori. Further with the variables being nominal in nature, the phi correlation of .740 demonstrates that the degree of association is quite strong, as normal values of phi range from -1.0 to +1.0.

(ii) PARKINSONS * CRYPTOSPORIDIUM

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	15.000[b]	1	.000		
Continuity Correction[a]	12.150	1	.000		
Likelihood Ratio	19.095	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	14.500	1	.000		
N of Valid Cases	30				

a. Computed only for a 2x2 table

b. 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.00.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.707			.000
	Cramer's V	.707			.000
	Contingency Coefficient	.577			.000
Ordinal by Ordinal	Kendall's tau-b	.707	.102	5.477	.000
	Spearman Correlation	.707	.102	5.292	.000[c]
Interval by Interval	Pearson's R	.707	.102	5.292	.000[c]
N of Valid Cases		30			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

With a minimum expected count of 5.00, and a Chi square value of 15.00, we see that these variables are not independent of each other and that there is a significant association between Parkinson's and Cryptosporidium. Further with the variables being nominal in nature, the phi correlation of .707 demonstrates that the degree of association is quite strong, as normal values of phi range from -1.0 to +1.0.

(iii) PARKINSONS * E. HYSTOLITICA

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	15.000[b]	1	.000		
Continuity Correction[a]	12.150	1	.000		
Likelihood Ratio	19.095	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	14.500	1	.000		
N of Valid Cases	30				

a. Computed only for a 2x2 table

b. 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.00.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.707			.000
	Cramer's V	.707			.000
	Contingency Coefficient	.577			.000
Ordinal by Ordinal	Kendall's tau-b	.707	.102	5.477	.000
	Spearman Correlation	.707	.102	5.292	.000[c]
Interval by Interval	Pearson's R	.707	.102	5.292	.000[c]
N of Valid Cases		30			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

With a minimum expected count of 5.00, and a Chi square value of 15.00, we see that these variables are not independent of each other and that there is a significant association between Parkinson's and E. Hystolitica. Further with the variables being nominal in nature, the phi correlation of .707 demonstrates that the degree of association is quite strong, as normal values of phi range from -1.0 to +1.0.

(iv) PARKINSONS * GIARDIA

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	9.600[b]	1	.002		
Continuity Correction[a]	7.350	1	.007		
Likelihood Ratio	10.653	1	.001		
Fisher's Exact Test				.005	.003
Linear-by-Linear Association	9.280	1	.002		
N of Valid Cases	30				

a. Computed only for a 2x2 table

b. 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.00.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.566			.002
	Cramer's V	.566			.002
	Contingency Coefficient	.492			.002
Ordinal by Ordinal	Kendall's tau-b	.566	.137	3.757	.000
	Spearman Correlation	.566	.137	3.630	.001[c]
Interval by Interval	Pearson's R	.566	.137	3.630	.001[c]
N of Valid Cases		30			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

With a minimum expected count of 5.00, and a Chi square value of 9.60, we see that these variables are not independent of each other and that there is a significant association between Parkinson's and Giardia. Further with the variables being nominal in nature, the phi correlation of .566 demonstrates that the degree of association is moderately strong, as normal values of phi range from -1.0 to +1.0.

(v) PARKINSONS * ROTAVIRUS

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	10.909[b]	1	.001		
Continuity Correction[a]	8.352	1	.004		
Likelihood Ratio	14.067	1	.000		
Fisher's Exact Test				.002	.001
Linear-by-Linear Association	10.545	1	.001		
N of Valid Cases	30				

a. Computed only for a 2x2 table

b. 2 cells (50.0%) have expected count less than 5. The minimum expected count is 4.00.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.603			.001
	Cramer's V	.603			.001
	Contingency Coefficient	.516			.001
Ordinal by Ordinal	Kendall's tau-b	.603	.105	4.140	.000
	Spearman Correlation	.603	.105	4.000	.000[c]
Interval by Interval	Pearson's R	.603	.105	4.000	.000[c]
N of Valid Cases		30			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

With a minimum expected count of 4.00, and a Chi square value of 10.909, we see that these variables are not independent of each other and that there is a significant association between Parkinson's and Rotovirus. Further with the variables being nominal in nature, the phi correlation of .603 demonstrates that the degree of association is quite strong, as normal values of phi range from -1.0 to +1.0.

(vi) PARKINSONS * CAMPHYLOBACTER

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	10.909[b]	1	.001		
Continuity Correction[a]	8.352	1	.004		
Likelihood Ratio	14.067	1	.000		
Fisher's Exact Test				.002	.001
Linear-by-Linear Association	10.545	1	.001		
N of Valid Cases	30				

a. Computed only for a 2x2 table

b. 2 cells (50.0%) have expected count less than 5. The minimum expected count is 4.00.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.603			.001
	Cramer's V	.603			.001
	Contingency Coefficient	.516			.001
Ordinal by Ordinal	Kendall's tau-b	.603	.105	4.140	.000
	Spearman Correlation	.603	.105	4.000	.000[c]
Interval by Interval	Pearson's R	.603	.105	4.000	.000[c]
N of Valid Cases		30			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

With a minimum expected count of 4.00, and a Chi square value of 10.909, we see that these variables are not independent of each other and that there is a significant association between Parkinson's and Camphylobacter. Further with the variables being nominal in nature, the phi correlation of .603 demonstrates that the degree of association is strong, as normal values of phi range from -1.0 to +1.0.

(vii) PARKINSONS * C. DIFFICELE

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	9.130[b]	1	.003		
Continuity Correction[a]	6.708	1	.010		
Likelihood Ratio	11.869	1	.001		
Fisher's Exact Test				.006	.003
Linear-by-Linear Association	8.826	1	.003		
N of Valid Cases	30				

a. Computed only for a 2x2 table

b. 2 cells (50.0%) have expected count less than 5. The minimum expected count is 3.50.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Phi	.552			.003
	Cramer's V	.552			.003
	Contingency Coefficient	.483			.003
Ordinal by Ordinal	Kendall's tau-b	.552	.105	3.623	.000
	Spearman Correlation	.552	.105	3.500	.002[c]
Interval by Interval	Pearson's R	.552	.105	3.500	.002[c]
N of Valid Cases		30			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

With a minimum expected count of 3.50, and a Chi square value of 9.13, we see that these variables are not independent of each other and that there is a significant association between Parkinson's and C. difficile. Further with the variables being nominal in nature, the phi correlation of .552 demonstrates that the degree of association is moderately strong, as normal values of phi range from -1.0 to +1.0.

III. AUTISM AND PATHOGENS

The following statistical test was performed using the data presented in Fig. 4 of my specification related to autistic children (N=13 subjects) and their gut pathogens. In the absence of a control group, a One Sample Kolmogrov-Smirnov test (also known as a Lilliefors), was performed in order to make a comparison to a normal distribution. This test compares the observed cumulative distribution function for a variable with a specified theoretical distribution, which in this case would be a normal distribution. Based on a one sample chi-test, if the test is significant, it indicates that the distribution is significantly different from a normal distribution.

One-Sample Kolmogorov-Smirnov Test

		HPYLORI	CRYPTO	EHYSTOL	GIRADIA	ROTAV	CAMPHYL	CDIFFICE
N		13	13	13	13	13	13	12
Uniform Parameters[a,b]	Minimum	1	1	1	1	1	1	1
	Maximum	2	2	2	2	2	2	2
Most Extreme Differences	Absolute	.538	.692	.615	.538	.538	.538	.583
	Positive	.538	.692	.615	.462	.538	.538	.417
	Negative	-.462	-.308	-.385	-.538	-.462	-.462	-.583
Kolmogorov-Smirnov Z		1.941	2.496	2.219	1.941	1.941	1.941	2.021
Asymp. Sig. (2-tailed)		.001	.000	.000	.001	.001	.001	.001

a. Test distribution is Uniform.

b. Calculated from data.

The results of this test indicate that for each of the pathogens listed the test is significant- P <.05, which means that the distribution is significantly different from normal, and could not have occurred by chance.

Accordingly, based on the above statistical correlations, and on the findings set forth in various Case studies presented in my specification, and further based on my findings with respect to common links between disorders such as PDD, Dysautonomia and Parkinson's disease with respect to GI function (e.g., low fecal chymotrypsin, multiple pathogens), I submit that one of ordinary skill in the art would conclude, either through logical scientific principles or by extrapolation by the data presented, that a reasonable correlation exists between (i) the presence of a plurality of different antigens in a stool sample of an individual and (ii) the existence of a disorder such as Dysautonomia, Parkinson's disease, and PDD (such as Autism, ADD and ADHD), or the potential for the individual to develop such disorders.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made herein on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine, imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application.

Dated: 1/20/03

Joan Fallon